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Silviculture and Ecology of Upland Central Hardwood Forests Research Unit

The Regeneration Of Group Selection Openings In Southern Indiana

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The group selection method combines some of the advantages of even-aged silvicultural methods with those of uneven-aged methods. The method maintains a fairly continuous tree canopy, which provides a more natural appearance to the forest than does any even-aged method. By creating small canopy openings, it also provides the light necessary for the growth of species that are shade intolerant or only moderately shade tolerant such as the oaks. However, there is little information on the application of the method in the Central Hardwood Region. This report describes the results of a research study on regeneration of group selection openings in south central Indiana.

The research study included 36 group selection openings ranging from 0.2 acre to 0.6 acre. An equal number of openings occurred on northerly facing slopes (315° to 135° azimuth) and southerly facing slopes (136° to 314° azimuth). These, in turn, were equally divided among three age classes: 6-10 years, 11-15 years, and 16-20 years from overstory removal. The composition of the overstories of the stands currently surrounding the openings was assumed to be characteristic of the openings before harvest. The adjacent stands consisted of 19 stands in the oak-hickory cover type and 17 stands in the mixed hardwood cover type. Averaged across all openings, the oak-hickory species group dominated the overstories of the adjacent stands (fig. 1). The only other species group comprising more than 10 percent of the trees within any cover type was beech-maple, which accounted for approximately 20 percent of the trees in the mixed hardwood cover type.

Regeneration

The composition of the reproduction in the openings after harvest differed greatly from the composition of the surrounding stands and thus from that of the presumed parent stands. For trees 1-inch d.b.h. and larger, yellow-poplar and flowering dogwood were the two most abundant species. Combined, they accounted for nearly 60 percent of the trees in all three age classes (fig. 2). In 16- to 20-year-old openings, beech-maple was the only other species group comprising more than 10 percent of the trees.[1] The oak-hickory species

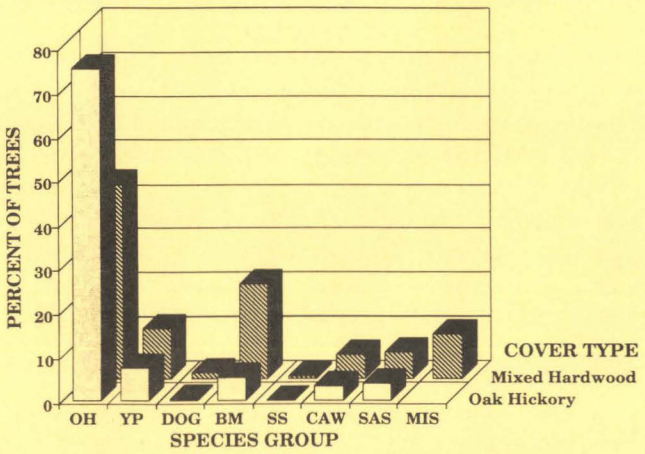

Figure 1.—*Composition of parent stands by species group[1] and cover type.*

[1] *Species groups include: oak-hickory (OH), yellow-poplar (YP), flowering dogwood (DOG), beech-maple (BM), shrubs and small trees (SS), cherry-ash-walnut (CAW), sassafras (SAS), and miscellaneous species (MIS).*

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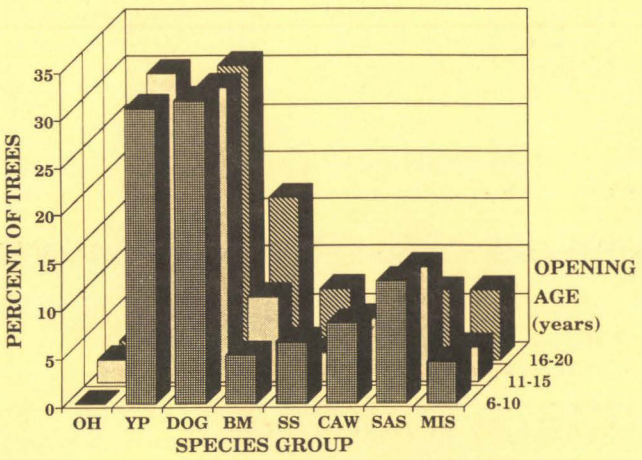

Figure 2.—*Composition of reproduction ≥1-inch d.b.h. in openings by species group[1] and opening age.*

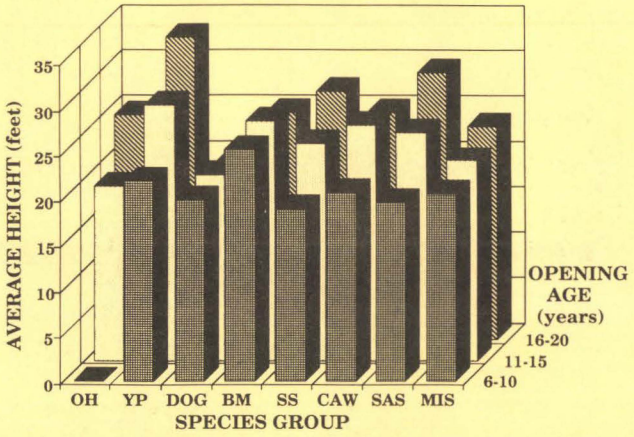

Figure 3.—*Average height of reproduction ≥1-inch d.b.h. in openings by species group[1] and opening age.*

group was absent in 6- to 10-year-old openings and comprised less than 5 percent of the trees in 11- to 15-year-old openings and in 16- to 20-year-old openings.

For trees less than 1-inch d.b.h., dogwood was the most abundant species in 6- to 10-year-old openings (not shown). Dogwood and cherry-ash-walnut were the most abundant species in 11- to 15-year-old openings. The cherry-ash-walnut group also was numerically dominant in 16- to 20-year-old openings. The oak-hickory species group comprised fewer than 10 percent of the trees less than 1-inch d.b.h. in all three age classes.

Among the species groups, the average heights of trees 1-inch d.b.h. and larger did not vary greatly within an age class. Within 6- to 10-year-old openings, trees in the beech-maple group were tallest on average (fig. 3). In 16- to 20-year-old openings, yellow-poplar was the dominant species, which averaged 6.5 ft taller than the other species. Trees less than 1-inch d.b.h. decreased in average height from youngest to oldest openings. In 16- to 20-year-old openings, only dogwood averaged more than 3 ft tall; all other species were approximately half that tall. This decrease in average height resulted from the growth of taller stems into the 1-inch-and-larger d.b.h. class, mortality of stems due to competition, and ingrowth of small, new stems into the 1-inch-and-smaller d.b.h. class.

Conclusions

Although the parent stands were largely dominated by species in the oak-hickory group, reproduction in openings now is dominated by other species, usually yellow-poplar. There is little evidence that, within the openings, more shade-tolerant understories are developing that can successionally replace yellow-poplar. However, species in the shade-tolerant beech-maple group, which are moderately abundant in many openings, have the potential to do so. In contrast, species in the oak-hickory group are poorly represented in both cover types in all age classes. The group selection method thus has largely failed to regenerate oaks. Even with early weeding and releasing, the modest number of oaks present probably could not restore the species to their former position of dominance in the openings. Despite the shift in species composition away from the oaks and toward other species, the openings are well stocked with trees of commercial and ecological value.

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